CLAIMS:

1.   A method of processing a substrate for a domain expansion storage medium in which a magnetic wall is displaced in a readout layer to thereby enlarge a magnetic domain of a storage layer so as to reproduce an information indicated by said magnetic domain, said method comprising the steps of:

5   a)   passing at least one beam of ions through a mask with a predetermined pattern so as to project said predetermined pattern towards said substrate;

b)   processing a surface by said at least one beam of ions at exposed portions; and

c)   depositing said storage layer above said processed surface so as to define magnetic domains of a data structure in said storage layer at portions corresponding to said

10   exposed portions.

2.   A method according to claim 1, further comprising an initial step of depositing an additional layer of a seed metal or a dielectric material on said substrate before performing said ion beam projection step, wherein the surface of said additional layer is processed in said

15   processing step.

3.   A method according to claim 1, wherein the surface of said substrate is processed in said processing step.

20   4.   A method according to claim 1, wherein said surface processing is a sputtering process to generate a pattern of roughened or smoothed areas at said exposed portions.

5.   A method according to any one of the preceding claims, wherein said processing step is adapted to modify optical properties at predetermined surface portions so

25   as to define a track structure of said storage medium.

6.   A method according to claim 5, wherein a first mask is used for forming said data pattern and a second mask is used for forming said track structure, or vice versa.

7.   A method according to claim 5 or 6, wherein said beam projection and processing steps are performed at least two times for said track structure.

8.   A method according to any one of claims 5 to 7, wherein said beam projection and processing steps are adapted to pattern embedded servo information into said surface.

9.   A method according to any one of the preceding claims, further comprising the step of controlling the focus of said at least one ion beam so as to modify the roughness of said surface.

10.   A method according to claim 9, wherein a first focus is used for forming said data structure, while a second focus is used for forming a servo pattern.

11.   A method according to any one of the preceding claims, wherein a whole disk is patterned in said ion beam projection and processing steps.

12.   A method according to any one of the preceding claims, further comprising the step of forming said mask by an e-beam lithography and a subsequent semiconductor etching.

13.   A domain expansion storage medium in which a magnetic wall is displaced in a readout layer to thereby enlarge a magnetic domain of a storage layer so as to reproduce the information indicated by said magnetic domain, said storage medium comprising an intermediate surface processed by ion beam projection lithography with a predetermined pattern to define at least one of a data pattern of said storage layer, a track pattern and a servo pattern.

14.   A storage medium according to claim 13, wherein said processed intermediate surface corresponds to the surface of a substrate of said storage medium.

15.   A storage medium according to claim 13, wherein said processed intermediate surface corresponds to the surface of a seed or dielectric layer deposited on a substrate of said storage medium.